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ABSTRACT

A review of research reveals that, although several reading researchers recognize the significance of grammatical complexity beyond the sentence in reading comprehension, little research exists in this area of grammatical interrelationships among sentences. The first step toward an understanding of grammatical complexity beyond the sentence is for reading researchers to specify elements within this linguistic phenomenon so that formalized rules can be established to govern the text-forming process. M. A. K. Halliday and Ruqaiya Hasan have provided such a first step with their explanation of cohesion, the relations in meaning that are achieved by references of certain lexical and grammatical elements to other elements across the sentences in discourse. Additionally, there is a need to determine how skilled writers use cohesive features in prose of various aims and modes. With further identification of models of performance, future research can determine how cohesive features affect first and second language speakers' comprehension of English, the differences in comprehension that occur for implicitly and explicitly stated content, and how attention to cohesive features can be used to measure readability. (RL)

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Linguistic Cohesion and the Reading Process:

A Review of Research

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Much of the research on comprehension and recall and on text readability has focused on grammatical complexity. Such studies have, of course, used the resources of existing grammatical theory in identifying grammatical sources of difficulty and aids to comprehension. Thus, the emphasis in both traditional and transformational theory on the sentence as the logical unit of predication and the ultimate grammatical unit has led reading theorists to focus on the sentence as the unit of measurement of syntactic difficulty in a text. Several reading researchers have indicated, nonetheless, that a crucial key to success in reading likely exists as well in a grammatical context beyond the sentence, implying the notion of some systematic lexical and syntactic interrelationships across sentences. No formal theory of grammatical interrelationships among sentences has been available to researchers interested in determining the role of such a phenomenon in reading, however. Perhaps the work of Halliday and Hasan (1976) on the linguistic phenomenon which they call cohesion may offer some of the theoretical base for reading research in this respect. I propose to review what reading researchers have indicated about the importance of looking beyond the sentence to consider the context when evaluating the grammatical complexity of a passage; next, to show essentially what Halliday and Hasan's work reveals about the reality of cohesive ties across sentence boundaries; finally, to note some implications for research in reading.

Researchers' Views on Grammatical Complexity

The Focus on the Sentence

The readability formulas using the syntactic component concentrate on sentence length. According to Hittleman, the Dale-Chall and Spache formulas consider syntax only in regard to sentence length (Hittleman, 1973). Klare takes somewhat greater note of grammatical complexity than those researchers do, conceding that "sentence complexity is probably the real causal factor in difficulty," but contending that "length correlates very highly with complexity and is much easier to count" (Klare, p. 97).

In their formula for measuring readability on the basis of syntactic complexity, Botel and Granowsky confine their focus to the sentence, using transformational-generative theory. Though they assign a count of two, of a possible three, to certain structures which may in some instances relate to elements across sentences--paired conjunctions, conjunctive adverbs, comparatives, dependent clauses--, they omit any attention to grammatical features beyond sentence boundaries (1972).

Recognition of Complexity Beyond the Sentence

Rosenshine is one reading researcher who has given some attention to the effects of grammatical features which operate across sentences. According to Hittleman (1973), Rosenshine includes the following as one of his five variables which can be

used to discriminate between passages that are more or less easily understood: the prepositions and conjunctions which indicate cause or result. The implication is that such prepositions and conjunctions may signal cause or result from sentence to sentence.

Hittleman notes three dissertation studies which examine the importance of context to readability. Fagan's 1971 study shows, according to Hittleman, that redundancy in language enables a reader to acquire missed information within other sentences of a passage and contradicts earlier studies which have indicated that the difficulty of a passage can be determined by the number of transformations within sentences (Hittleman, p. 786). Also according to Hittleman's account, Moir concludes in his 1969 dissertation that "the degree of difficulty experienced by young readers is a function of both the semantic load and the grammatical complexity in the material, and that the ease with which a reader identifies and uses the syntactic context of a passage directly influences the degree to which he understands the written material" (Hittleman, p. 788). Finally, Hittleman reports that in 1972 Patterson was focusing in his dissertation on intersentence features in an attempt to "determine if intersentence syntactic style factors, such as repetitiveness of lexical elements, affect the readability of a passage" (p. 786).

In his report of what reading researchers have shown about children's understanding of linguistic connectives, Walmsley (1977), noting the function of connectives as linking "propositions within

and between sentences" (p. 292), observes that the connective in reading research literature has received little attention beyond the passing reference of a few theorists, among them Huey, Thorndilse, Flesch, and Smith (p. 255).

Stoodt's study of the role of conjunctions in comprehension suggests an awareness of the possibly significant role of inter-sentence syntactic ties. Using a researcher-developed Comprehension of Conjunctions Test, along with some standard tests, she Substantiated these hypotheses: 1) There is a significant correlation between a subject's ability to identify relationships that conjunctions signal and his reading comprehension. 2) There is a significant difference in the difficulty of various types of conjunctions. 3) There is a significant relationship between understanding conjunctions and the variables of sex, socio-economic level, and intelligence (1972, p. 502). Inasmuch as some conjunctions may signal relations across sentence boundaries, Stoodt's findings seem to support the notion that syntactic relations beyond the sentence affect comprehension.

In his special study of the relationship between syntax and readability, Dawkins recognizes the importance of context to readability (1975). Of the nine facets of context which he lists, he includes "grammatical presuppositions (referential relationships) and linguistic redundancies (vocabulary and syntax)" (p. 43). In his segment on substitution, Dawkins says this concerning the difficulty which a reader may experience with pronouns: "To measure

difficulty of this kind, we would need a device that can go beyond the boundary of a single sentence" (p. 31).

Bormuth, Manning, Carr, and Pearson (1970) have looked not only at the sentence to establish readability levels but have measured comprehension of some features of intersentence syntax and of instances of anaphora. They cite horse→steed as an example of what they term a "semantic substitute," observing that this is one of "the most basic syntactic structures by which information is signaled in language" (p. 355). Using Wh-questions and some multiple-choice questions, they found comprehension deficiency in the fourth-graders they were testing. Consequently, these researchers question whether instruction is effective if children exhibit the kinds of limitations which they found in respect to sentence syntax, intersentence syntax, and anaphora (p. 356).

Ruddell summarizes the results of his own longitudinal study of the sentence and paragraph meaning comprehension of first- and second-grade children as showing that emphasizing structural elements within and between sentences enhances children's comprehension (Ruddell, pp. 30-31). If it is accurate to infer that by "structural elements" Ruddell means grammatical features rather than logical structure, then it appears that his study also assigns importance to grammatical complexity beyond the sentence.

Franks and Bransford report that their study of syntactic form as a function of semantic context shows that the individual sentence is not the unit of memory. They point out that what is

remembered is a wholistic semantic unit realized by various sentences. On the basis of this finding, they suggest that it could be useful to "explore the contextual conditions under which certain forms of input result in greater understanding and recall" (Franks and Bransford, p. 107). They likely would include grammatical features as part of that input.

In two respects Pearson's study of the effects of grammatical complexity on comprehension and recall implies an important role for grammatical context beyond sentence boundaries (Pearson, pp. 67-102). One implication inheres in Pearson's discussion of children's comprehension of causal relations. His findings contradict the view that comprehension difficulty can be decreased by omitting subordinating constructions and reducing sentence length in reading materials. He holds that perhaps grammatically more complex and longer sentences are easier to comprehend because such structures are more explicit than the semantically equivalent simpler, shorter structures are. He cautions in this regard that though readers may be able to infer relationships which happen to have occurred within their own experience, they may not be able to infer such relationships from simple structures about unfamiliar content if those relationships are not represented explicitly through grammar. Upon the basis of his experiments with causality, Pearson concludes that, at least in regard to content concerned with causality, people store the content in unified segments rather than in discrete units. There is the implication

here that if, as certainly must be true, unified segments may constitute several sentences, and, if the relationships expressed in those segments must be represented explicitly through the grammar, then there likely are important grammatical ties among the sentences of such unified segments. Pearson's second implication that grammatical complexity beyond the sentence may be a significant factor in reading occurs in his evaluation of the "chunk model" of information processing as a valid explanation of processing data in reading. He sees in the chunk model the assumption that the mind processes verbal data in semantic chunks rather than in discrete deep structure components and thus synthesizes those storage units in the process of comprehension. Since the processing of verbal data into semantic chunks frequently would involve processing data from segments of discourse larger than a sentence, it may be inferred that grammatical complexity beyond the sentence is an important factor in comprehension and recall. When Pearson suggests research into passages similar to those in his experiments in contextual settings and also research on readability that uses knowledge of rule-governed structures for variation of experimental passages, he addresses the possibility that researchers would utilize rules that account for grammatical structures across the sentences of a text.

Meyer (1975) deals primarily with the semantic structure of prose, using Fillmore's 1968 case grammar and Grimes' 1974 semantic grammar of propositions as bases for analyzing the organization

of information in a text, but she does give some attention to one non-content feature of prose which she calls "signaling." Signaling, she explains, "gives emphasis to certain aspects of the semantic content or points out aspects of the structure of the content" (p. 77). The major types of signaling identified by Meyer are: "(1) the specification of the structure of relations in the content structure, (2) prematurely revealed information abstracted from content occurring later in the text, (3) summary statements, and (4) pointer words" (p. 77). It is apparent that some of the features which Meyer terms "signaling," particularly "pointer words," constitute grammatical features which may operate in contexts larger than the sentence. Although the statistical results of her study reveal that signaling has only a small effect on recall, Meyer contends that these results were likely peculiar to the conditions of her experiment and proposes that, because special signaling patterns occur in all languages, it is likely that signaling "promotes the survival of meaning in communication" (p. 157).

The Nature of Cohesion in English

Halliday and Hasan (1976) explain that wherever the interpretation of any element in a discourse requires making reference to some other item in the discourse, there is cohesion. They assert that in examining cohesion in a text, they are not concerned with structural relations in the sense of grammatical relations

between sentences but rather with relations in meaning which are achieved by the reference of certain lexical and grammatical elements to other elements across the sentences of the discourse.

They note:

Within a text the meaning of each sentence depends on its environment, including its cohesive relations with other sentences. When we consider cohesion, therefore, we are investigating the linguistic means whereby a text is enabled to function as a single meaningful unit (pp. 29-30).

To further clarify the crucial role of cohesion, Halliday and Hasan explain that it provides the continuity "that enables the reader or listener to supply all the missing pieces, all the components of the picture which are not present in the text but are necessary to its interpretation" (p. 299). They identify these specific types of cohesion and these specific elements occurring within each type:

1. Reference, which includes the specific elements pronominals, demonstratives, definite articles, comparatives;
2. Substitution, which includes nominal substitutes, verbal substitutes, and clausal substitutes;
3. Ellipsis, which includes nominal ellipsis, verbal ellipsis, clausal ellipsis;
4. Conjunction, which includes these features: additive, adversative, causal, temporal, continuative; and
5. Lexical cohesion, which includes these features: same item, synonym, superordinate, general item, collocation.

The following example of substitution cited by Halliday and Hasan illustrates the principle of cohesion and its crucial function in discourse:

Would you like this teapot?
--No, I want a square one (p. 306).

Just before presenting this example, Halliday and Hasan first show that very often reference to an item within a unit of discourse (endophoric) takes precedence over reference to an element in the situation (exophoric) and, in so doing, accomplishes the cohesive or text-forming process. Then they use the example of substitution to show that in other instances the cohesion may inhere not in endophoric reference but in the relation of one linguistic item to another through substitution. Hence the example illustrates such a link between linguistic items. More precisely they point out that this occurrence of substitution accomplishes a continuity through the "environment of contrast" (p. 306). Thus, according to Halliday and Hasan, "the relation between the two instances ['this teapot' and 'a square one'] is a relation established at the lexicogrammatical level" (p. 306). "The resulting continuity of the discourse lies, apparently, not in the meaning but in the form" (p. 306).

Implications for Research in Reading

The review of the research reveals that, though several reading researchers recognize that a phenomenon of grammatical complexity

beyond the sentence may be a significant factor in reading comprehension, little reading research into the area exists. Of course, there is the need for reading researchers first to have a scientific specification of what constitutes such a linguistic phenomenon and perhaps to have access to formalized rules that govern this text-forming process. Halliday and Hasan have provided the former in their explanation of cohesion. Additionally, there is a need to determine how skilled writers use cohesive features in prose of various aims and modes. Gutwinski (1976) has analyzed the cohesion in some selections from modern literary writings in the narrative and descriptive modes. A doctoral dissertation now underway at the University of Texas at Austin will contain an analysis of cohesion in all four modes of the referential discourse of several contemporary published writers. With further identification of models of performance in this respect, perhaps research in reading may:

- determine the levels at which first-language speakers of English comprehend the various cohesive features,
- determine the degree to which second-language speakers of English comprehend certain cohesive features,
- determine what differences in comprehension occur and at which levels between implicitly stated content and content stated explicitly with certain cohesive features, and
- formulate instruments that include attention to cohesive features in measuring readability.

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